Amendments to the Claims

1. (Currently Amended) A method for allocation of an available power budget to Discrete Multi-Tone (DMT) frequency tones ~~in a DMT-based Digital Subscriber Line (DSL) modem~~, wherein each of said tones corresponds to a bin of a plurality of bins, each of said bins in said plurality representing a portion of a predetermined bandwidth, said method comprising the steps of:

~~initiating the DMT-based DSL modem by~~ calculating for each of said bins aggregate values of channel attenuation, noise power, and power mask;

pre-filtering to flag ~~noisy bins~~, as a function of at least one of said channel attenuation, noise power and power mask, bins that are unable to support a minimum number of bits with a maximum power available for transmission in a bin; and

using a repeated-bisection splitting scheme to allocate the available power substantially optimally among ~~a~~ said plurality of ~~bands for DMT frequency tones~~bins,

~~where bins flagged by the pre-filtering step remain unexcluded, said scheme excludes the bins flagged in the pre-filtering step.~~

wherein at least a first flagged bin in said plurality of bins is excluded from being allocated power.

2. (Original) The method of claim 1 wherein the repeated-bisection splitting scheme includes the steps of:

splitting the available power optimally between the lower and the upper halves of a 1.104- MHz bandwidth to form two power fractions for two substantially 552 KHz wide bands;

splitting each of the two power fractions substantially optimally between two halves of each of the substantially 552 KHz wide bands to form four power fractions for four substantially 276 KHz wide bands;

splitting each of the four power fractions optimally between two halves of each of the four substantially 276 KHz wide bands to form eight power fractions for eight substantially 138 KHz wide bands;

splitting each of the eight power fractions optimally between two halves of each of the eight substantially 138 KHz wide bands to form sixteen power fractions for sixteen substantially 69 KHz wide bands;

splitting each of the sixteen power fractions optimally between two halves of each of the sixteen substantially 69 KHz wide bands to form thirty-two power fractions for thirty-two substantially 34.5 KHz wide bands;

splitting each of the thirty-two power fractions optimally between two halves of each of the thirty-two substantially 34.5 KHz wide bands to form sixty-four power fractions for sixty-four substantially 17.25 KHz wide bands;

splitting each of the sixty-four power fractions optimally between two halves of each of the sixty-four 17.25 KHz wide bands to form one hundred twenty eight power fractions for one hundred twenty eight substantially 8.625 KHz wide bands; and

splitting each of the one hundred twenty eight power fractions optimally between two halves of each of the one hundred twenty eight, 8.625 KHz wide bands to form two hundred fifty six power fractions to form two hundred fifty six substantially 4.3125 KHz wide bands.

3. (Currently Amended) The method of claim 2 wherein the step of initializing ~~step of claim 1 provides for~~ comprises calculating said aggregate parameters ~~needed for the steps of claim 2~~ while excluding noisy bins that are flagged as unable to support a minimum number of bits with a maximum power available for transmission in a bin.

4. (Original) The method of claim 3 wherein each of 2^j elements of a noise power vector to be used at step-j is calculated as a sum of noise power values in bins aggregated for the step-j, where j=1,…,8.

5. (Original) The method of claim 3 wherein each of the 2^j elements of a channel attenuation vector that is to be used at step-j is calculated as an average of channel attenuation values in bins aggregated for step-j, where j=1,…,8.

6. (Original) The method of claim 3 wherein each of 2^j elements of a power mask vector that is to be used at step-j is calculated as a sum of power mask values in bins aggregated for step-j, where j=1,…,8.

7. (Original) The method of claim 1 wherein the available power is allocated to 2^n tones where n is a preselected integer.

8. (Original) The method of claim 7 wherein initializing includes calculating aggregate parameter values of channel attenuation, noise power, and power mask for n subsequent steps.

9. (Currently Amended) An apparatus for allocating an available power to a plurality of Discrete Multi-Tone (DMT) frequency tones using a repeated-bisection of power scheme to partition the available power over the plurality of DMT frequency tones, wherein each of said tones corresponds to a bin of a plurality of bins, each of said bins in said plurality representing a portion of a predetermined bandwidth, ~~in a DMT-based Digital Subscriber Line (DSL) modem,~~ said apparatus comprising:

an initialization unit, for ~~initializing the DMT-based DSL modem by~~ calculating for each of said bins an aggregate parameter values of channel attenuation, noise power, and power mask;

a pre-filtering unit, coupled to the initialization unit, for pre-filtering to flag~~-~~, as a function of at least one of said channel attenuation, noise power and power mask, ~~noisy~~ bins that are unable to support a minimum number of bits with a maximum power available for transmission in a bin; and

a repeated-bisection power splitting and allocation unit, coupled to the pre-filtering unit, for using the repeated-bisection of power scheme to allocate available power substantially optimally among ~~a~~ said plurality of ~~bands for DMT frequency tones~~bins.

10. (Original) The apparatus of claim 9 wherein the repeated-bisection splitting unit implements the repeated-bisection of power scheme by:

splitting the available power optimally between the lower and the upper halves of a 1.104-MHZ bandwidth to form two power fraction for two substantially 552 KHz wide bands;

splitting each of the two power fractions substantially optimally between two halves of each of the substantially 552 KHz wide bands to form four power fractions for four substantially 276 KHz wide bands;

splitting each of the four power fractions optimally between two halves of each of the four substantially 276 KHz wide bands to form eight power fractions for eight substantially 138 KHz wide bands;

splitting each of the eight power fractions optimally between two halves of each of the eight substantially 138 KHz wide bands to form sixteen power fractions for sixteen substantially 69 KHz wide bands;

splitting each of the sixteen power fractions optimally between two halves of each of the sixteen substantially 69 KHz wide bands to form thirty-two power fractions for thirty-two substantially 45.5 KHz wide bands;

splitting each of the thirty-two power fractions optimally between two halves of each of the thirty-two substantially 34.5 KHz wide bands to form sixty-four power fractions for sixty-four substantially 17.25 KHz wide bands;

splitting each of the sixty-four power fractions optimally between two halves of each of the sixty-four 17.25 KHz wide bands to form one hundred twenty eight power fractions for one hundred twenty eight substantially 8.625 KHZ wide bands; and

splitting each of the one hundred twenty eight power fractions optimally between two halves of each of the one hundred twenty eight, 8.625 KHz wide bands to form two hundred fifty six power fractions to form two hundred fifty six substantially 4.3125 KHz wide bands.

11. (Original) The apparatus of claim 9 wherein the initialization unit is further coupled to the pre-filtering unit to receive notification of the bins that are flagged, calculates aggregate parameter values needed to implement the repeated-bisection of power scheme and excludes bins flagged by the pre-filtering unit.

12. (Original) The apparatus of claim 9 where each of 2^j elements of a noise power vector to be used at step-*j* of the repeated-bisection of power scheme is calculated as a sum of noise power values in bins aggregated for the step-j, where j=1,...,8.

13. (Original) The apparatus of claim 9 wherein each of 2^j elements of a channel attenuation vector that is to be used at step-*j* of the repeated-bisection of power scheme is calculated as an average of channel attenuation values in bins aggregated for step-j, where j=1,...,8.

14. (Original) The apparatus of claim 9 wherein each of 2^j elements of a power mask vector that is to be used at step-*j* of the repeated-bisection of power scheme is calculated as a sum of power mask values in bins aggregated for step-j, where j=1,...,8.

15. (Original) The apparatus of claim 9 wherein the available power is allocated to 2^n tones where *n* is a preselected integer.

16. (Original) The apparatus of claim 9 wherein the initialization unit initializes the modem by calculating aggregate parameter values of channel attenuation, noise power, and power mask for *n* subsequent steps.

17. (Currently Amended) Computer readable medium having computer-executable instructions for allocation of an available power to Discrete Multi-Tone (DMT) frequency tones, wherein each of said tones corresponds to a bin of a plurality of bins, each of said bins in said plurality representing a portion of a predetermined bandwidth, ~~in a DMT-based Digital Subscriber Line (DSL) modem,~~ further wherein the computer-executable instructions comprise the steps of:

~~initializing the modem by~~ calculating for each of said bins aggregate values of channel attenuation, noise power, and power mask;

pre-filtering to flag~~-~~, as a function of at least one of said channel attenuation, noise power and power mask, bins ~~noisy bins~~ that are unable to support a minimum number of bits with a maximum power available for transmission in a bin; and

using a repeated-bisection splitting scheme to allocate the available power substantially optimally among ~~a~~ said plurality of ~~bands for DMT frequency tones~~bins.

18. (Original) The computer readable medium of claim 17 wherein the repeated-bisection splitting scheme includes the steps of:

splitting the available power optimally between the lower and the upper halves of a 1.104 MHZ bandwidth to form two power fractions for two substantially 552 KHz wide bands;

splitting each of the two power fractions substantially optimally between two halves of each of the substantially 552 KHz wide bands to form four power fractions for four substantially 276 KHz wide bands;

splitting each of the four power fractions optimally between two halves of each of the four substantially 276 KHz wide bands to form eight power fractions for eight substantially 138 KHz wide bands;

splitting each of the eight power fractions optimally between two halves of each of the eight substantially 138 KHz wide bands to form sixteen power fractions for sixteen substantially 69 KHz wide bands;

splitting each of the sixteen power fractions optimally between two halves of each of the sixteen substantially 69 KHz wide bands to form thirty-two power fractions for thirty-two substantially 34.5 KHz wide bands;

splitting each of the thirty-two power fractions optimally between two halves of each of the thirty-two substantially 34.5 KHz wide bands to form sixty-four power fractions for sixty-four substantially 17.25 KHz wide bands;

splitting each of the sixty-four power fractions optimally between two halves of each of the sixty-four 17.25 KHz wide bands to form one hundred twenty eight power fractions for one hundred twenty eight substantially 8.625 KHz wide bands; and

splitting each of the one hundred twenty eight power fractions optimally between two halves of each of the one hundred twenty eight, 8.625 KHz wide bands to form two hundred fifty six fractions for two hundred fifty six substantially 4.3125 KHz wide bands.

19. (Currently Amended) The computer readable medium of claim ~~17~~ 18 wherein the computer-executable step of initializing includes calculating, for bins unexcluded by pre-filtering flagging, aggregate parameter values ~~needed for the steps of claim 18~~.

20. (Original) The computer readable medium of claim 17 wherein each of 2^j elements of a noise power vector to be used at step-*j* of the repeated-bisection splitting scheme is calculated as a sum of noise power values in bins aggregated for the step-j, where j=1,...,8.

21. (Original) The computer readable medium of claim 17 wherein each of 2^j elements of a channel attenuation vector that is to be used at step-*j* of the repeated-bisection splitting scheme is calculated as an average of channel attenuation values in bins aggregated for step-j, where j=1,...,8.

22. (Original) The computer readable medium of claim 17 wherein each of 2^j elements of a power mask vector that is to be used at step-*j* of the repeated-bisection scheme is calculated as a sum of power mask values in bins aggregated for step-j, where j=1,...,8.

23. (Original) The computer readable medium of claim 17 wherein the available power is allocated to 2^n tones where *n* is a preselected integer.

24. (Original) The computer readable medium of claim 17 wherein initializing includes calculating aggregate parameter values of channel attenuation, noise power, and power mask for *n* subsequent steps.

25. (Currently Amended) A modem having an apparatus for allocating an available power to a plurality of Discrete Multi-Tone (DMT) frequency tones using a repeated-bisection of power scheme to partition the available power over the plurality of DMT frequency tones, wherein each of said tones corresponds to a bin of a plurality of bins,

each of said bins in said plurality representing a portion of a predetermined bandwidth, ~~in a DMT-based Digital Subscriber Line (DSL) modem~~ , ~~,~~the apparatus comprising:

an initialization unit, for ~~initializing the DMT-based DSL modem by~~ calculating for each of said bins an aggregate parameter values of channel attenuation, noise power, and power mask;

a pre-filtering unit, coupled to the initialization unit, for pre-filtering to flag~~-~~, as a function of at least one of said channel attenuation, noise power and power mask,~~noisy~~ bins that are unable to support a minimum number of bits with a maximum power available for transmission in a bin; and

a repeated-bisection power splitting and allocation unit, coupled to the pre-filtering unit, for using the repeated-bisection of power scheme to allocate available power substantially optimally among ~~a~~ said plurality of ~~bands for DMT frequency tones~~bins.